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The Taxonomic Position of *Desmodium bolsteri* (Leguminosae), a Species Endemic to the Philippines

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Desmodium bolsteri Merr. & Rolfe is newly accommodated to section Heteroloma of subgenus Sagotia. Several taxonomic characters of the species including pollen morphology are described. A key to all the Asian species of the section is provided.

Desmodium bolsteri Merr. & Rolfe is endemic to Luzon island in the Philippines and its taxonomic position is not clear. In the original description (Merrill and Rolfe 1908), the species was said to be unrelated to any species of the genus. Merrill (1910) later placed it in section Dollinera. Among the species of *Desmodium* then known in the Philippines, he considered *D. bolsteri* close to *D. sinuatum* because both are shrubs with sessile pods which are slightly indented along both sutures and both have short deltoid calyx-teeth. Van Meeuwen (1962) treated it as an imperfectly known species when she complied all the then know *Desmodium* in Malaysia. Ohashi (1973) accommodated the species in subgenus Sagotia, because *D. bolsteri* shares with other species of that subgenus diadelphous stamens, ebracteolate pedicels and lax-flowered inflorescences with 2 flowers at a node. He considered it close to *D. heterocarpon*, a member of section Nicolsonia in the subgenus, because of similarity of petal shape.

The section Dollinera adopted by Merrill (1910) corresponds to subgenus Dollinera in the system of Ohashi (1971, 1973) and *Desmodium sinuatum* is now identical with *D. sequax*, a member of subgenus Dollinera. The subgenus is characterized by monadelphous stamens, but *D. bolsteri* has diadelphous stamens. *Desmodium sequax* differs from *D. bolsteri* in bracteoles, calyx and flowers. Bracteoles are present in *D. sequax*, but not in *D. bolsteri*; the upper calyx-lobe is partly connate in *D. sequax*, but entirely so in *D. bolsteri.* The standard is elliptic to broadly elliptic in *D. sequax*, but orbicular or very broadly obovate in *D. bolsteri*; the claw of the wings is nearly as long as that of the keels in *D. sequax*, but distinctly shorter in *D. bolsteri*; and the keel-blade is auriculate at the adaxial base in *D. sequax*, but not in *D. bolsteri. Desmodium bolsteri*, therefore, does not fit well in this subgenus.

The petals are characteristic in *Desmodium* subgen. Sagotia. The wing has a short claw and auriculate blade, while the keels have a long claw and cuneate blade. The keel is adnate to the wing along the border between the blade and the claw. *Desmodium bolsteri* shares these features with the subgenus, hence, the species is placed in this subgenus. Within the subgenus, *D. bolsteri* possibly belongs to section Nicolsonia or section Heteroloma according to calyx and leaflet characters. Differences between sect. Nicolsonia and sect. Heteroloma

are clear in the arrangement pattern of the primary bracts in young inflorescences and in pod shape. In Nicolsonia the primary bracts persistently cover the young inflorescences, as in coniferous strobili, and the pods are narrowly oblong due to a shallow constriction along the lower margin, while in Heteroloma the primary bracts are deciduous and the pods are semimoniliform due to a deep constriction along the lower margin (Ohashi 1973). *Desmodium bolsteri* shares these characters with species of section Heteroloma and it should, therefore, be put in this section.

Within Heteroloma *Desmodium bolsteri* is similar to *D. oblongum* and *D. concinnum* in having an entire upper calyx-lobe and an orbicular or very broadly obovate emarginate standard with a short claw.

Desmodium bolsteri is also similar to *Trifidacanthus unifoliolatus* Merr. in its shrubby habit, leaflet venation pattern, pods in which the upper suture is indented and the lower one undulate at the joint (isthmus ca. 1/4 as broad as the pod), and fine-reticulate tricolporate pollen grains. *Trifidacanthus unifoliolatus* is distributed on Lombok Island in the Lesser Sunda Islands, Luzon Island in the Philippines and Hainan Island in south China and is characterized in having trifid spines (Ohashi et al. 1996). However, since *T. unifoliolatus* has coriaceous unifoliolate leaves, the calyx having lateral lobes equal to the lowest one, monadelphous stamens, and a clawed and auriculate standard, this species is difficult to recognize as being closely related to *D. bolsteri.*

Taxonomic treatment

Desmodium bolsteri Merr. & Rolfe in Philip. J. Sci. **3**: 102 (1908); Merr. in Philip. J. Sci. **5**: 83 (1910) & Enum. Philip. Fl. Pl. **2**: 284 (1923); van Meeuwen in Reinwardtia **6**: 265 (1962); Ohashi in Ginkgoana **1**: 250 (1973).

Additional description to Ohashi (1973 on page 250–251).

Stipels filiform, about 2 mm long, appressed pubescent, ciliate. Inflorescences terminal, pseudoracemose, 2–10 cm long, lax-flowered; flowers each 2 at a node; bracts early deciduous, ovate, 2–3 mm long, 1–1.5 mm wide; pedicels 8–15 mm long, with sparsely patent or ascending long hairs; bracteoles absent. Calyx funnel-shaped, pubescent and puberulent, without hooked hairs, 4-lobed; upper lobe joined, obtuse at apex, the lowest lobe a little longer than the other lobes. Stamens diadelphous, the adaxial one free. Ovary densely appressed sericeous. Pods (in young stage) stipitate (the stipe 3–4 mm long), broadly linear, 4–5-jointed, about 3 cm long, reticulate nerved, densely pubescent with variously curved hairs, without hooked hairs, both sutures thickened, the upper indented slightly but the lower deeply, isthmus about 1/4 as broad as the pod; articles roundish broad-oblong, 6–6.5 mm × 4–4.5 mm in size.

Pollen grains tricolporate; (28–)31(–34) μm in polar axis, (25–)28(–31) μm in equatorial diameter; P/E = (1.00–)1.11(–1.26), prolate spheroidal to subprolate in shape, elliptic or rhombic in equatorial view, almost angular in polar view; colpi medium to long, 0.8–0.9 the length of the polar axis, ca. 9 μm wide at the equator, narrowing to pointed ends, colpus membrane with fine granules, margins undifferentiated from the mesocolpium; endoaperture large, 0.2–0.3 the length of the polar axis; sexine tectate; sculpture of the mesocolpium finely rugulate to microreticulate, lumina 0.1–0.3 μm in diameter.

Specimens examined.

Philippines. Luzon. Cagayan Prov., Pena Blanca. Shrub 4 ft. high, alt. ca. 500 ft., on boulders in stream, flower "blue". Oct. 7, 1905. Bolster 181 (K–**Lectotype**); Tngnegarao, on rock in midstream, 500 ft. above the sea. 4 ft. high, fls. blue. Bolster 181, Oct. 7, 1905 (MO, UC); loc. cit. Mar.–May 1929, M. Ramos Bur. Sci. 76896 (K, NY voucher for pollen morphology, SING); Prov. of Nueva Ecija, Alvarez For. Bur. 22127, Dec. 1910 (K); Lagum. 7 May 1917. Adduru 209 (A).

Fig. 1. a, Lectotype of *Desmodium bolsteri* Merr. & Rolfe (Bolster 181, K); b, Inflorescences with young pods (Adduru 209, A).

Bolster 181 (MO, UC) was collected at Tngnegarao, not "Pena Blanca" as was the type, though it has the same collector and collection number as the type. I treat this specimen as different from the type. The original description states "Flowers unknown", but Bolster 181 in MO and UC bears flowers and young fruits.

Desmodium bolsteri is apparently a very rare species. Only a limited number of herbarium specimens are available and no recent collections of this species have been found in relevant herbaria worldwide. The possibility of extinction of this species is much feared.

Key to the Asian species of section Heteroloma

1. Secondary bracts absent; flowers longer than 5 mm; pods distinctly stiped; terminal leaflet usually narrower than 3 cm 2
1. Secondary bracts present; flowers shorter than 5 mm; pods sessile or shortly stiped; terminal leaflet usually broader than 3 cm 4
2. Leaves 1-foliolate; terminal leaflet narrowly ovate or narrowly elliptic, with minute

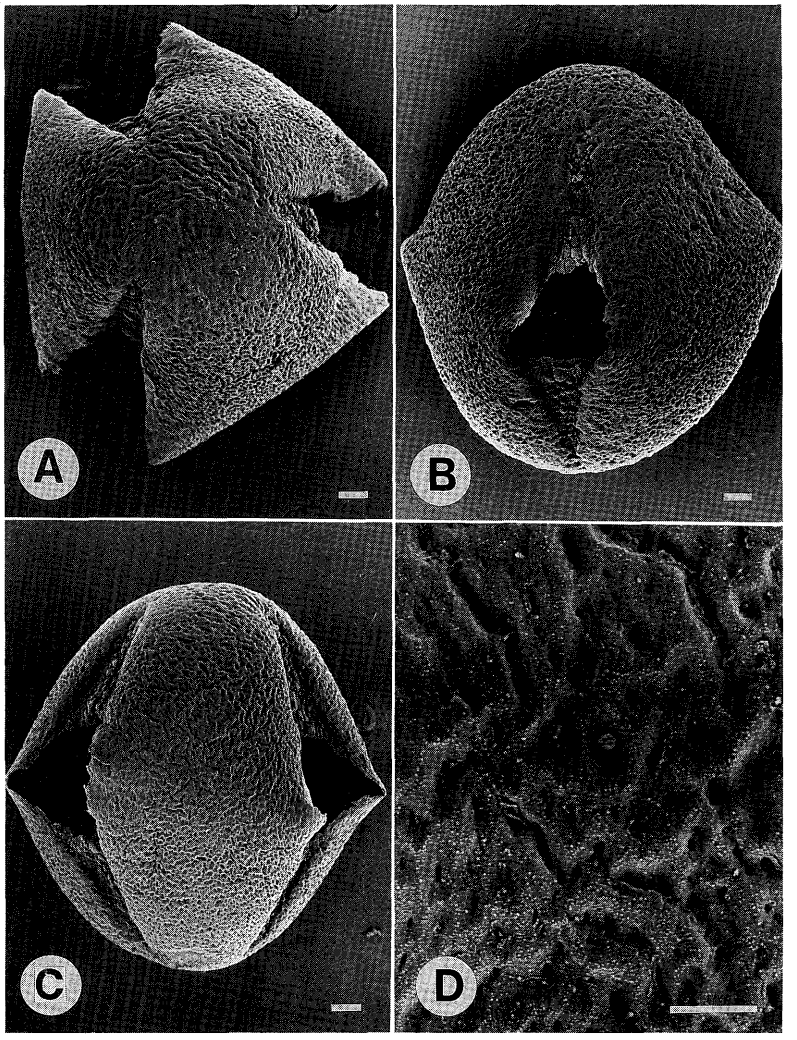

Fig. 2. Pollen grains of *Desmodium bolsteri*. A. Polar view; B. Equatorial view; C. Equatorial view showing mesocolpium; D. Enlarged mesocolpium. Scale bar = 1 μm. Voucher specimen: Ramos Bur. Sci. 76896 (NY).

hooked hairs below; inflorescences paniculate, with both straight and hooked hairs on the rachis; primary bracts 5–6.5 mm long ..... *D. oblongum*

2. Leaves 3-foliolate; terminal leaflet elliptic or obovate, without hooked hairs below; inflorescences pseudoracemose 3
3. Terminal leaflet chartaceous, 2–4 cm long; inflorescences 2–10 cm long, with both straight and hooked hairs on the rachis; primary bracts ovate, 2–3 mm long..... ..... *D. bolsteri*
3. Terminal leaflet subcoriaceous, (3–)5–8(–9) cm long; inflorescences 20–35 cm long in the terminal one, with hooked hairs on the rachis; primary bracts narrowly ovate with long acuminate apex, 9–12 mm long ..... *D. concinnum*
4. Leaves with conspicuous reticulate veinlets on the lower surface; stipules triangular

with a long acuminate apex; pedicels 1.5–2 mm long; pods with very densely straight and hooked hairs ..... *D. velutinum*

4. Leaves with inconspicuous reticulate veinlets on the lower surface; stipules narrowly triangular; pedicels longer than 3 mm; pods glabrescent 5
5. Leaves 3-foliolate; lateral nerves of leaflets looped within the margin ..... *D. pryonii*
5. Leaves 1-foliolate; lateral nerves of leaflets extending to the margin 6
6. Leaflets orbicular to broadly elliptic, rounded at the apex ..... *D. flexuosum*
6. Leaflets usually narrowly to normally elliptic or ovate, acute to acuminate at the apex ..... *D. gangeticum*

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大橋広好：マメ科 ***Desmodium bolsteri*** の分類学上の位置

Desmodium bolsteri Merr. & Rolfeはこれまで属内で分類学的位置のはっきりしていない種であった．本種はフィリピンのルソン島に稀産する固有種である（既に絶滅した可能性もある）．本種の分類学上の位置について，Merrill (1910) はヌスビトハギ属 Dollinera 亜属に属するものと考え，van Meeuwen (1962) は所属不明とし，Ohashi (1973) は Sagotia 亜属に属し，シバハギ *Desmodium heterocarpon* (L.) DC. に近いとした．また，ロンボク島，ルソン島，海南島に知られている *Trifidacanthus unifoliolatus* Merr. にも似ている点がある．本研究では，花，花粉，果実の形態を主に比較して考察した結果，本種がヌスビトハギ属 Sagotia 亜属の Heteroloma 節に属すると結論した．本論文では，同節に含まれるアジア産の全種の区別を検索表で示した．また，従来の本種の記載 (Ohashi 1973) を補足した．

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